Abstract

The Humboldt State University STEM Collaborative project integrates a curriculum, student services and faculty development around common thematic place-based learning communities. The first, called The Klamath Connection, will engage students with issues from the Klamath River Basin. The important issues of the Klamath are complex, engaging, and conceptually multidisciplinary. By weaving this theme into a summer immersion, freshman year experience (FYE), introductory gateway courses, and general education requirements and block scheduling the participating students into their freshman year courses, we hope to see significant improvements in the graduation and retention rates of underrepresented students in STEM. Our goal is to determine if we can turn a challenge – our geographic isolation and a rural setting unfamiliar to many of our students – into an opportunity to foster a sense of place in students, enable them to see how their own life experiences relate to new peoples and landscapes, and to emphasize how science and technology can be applied to address problems facing people of all places and cultures.

Background

Located approximately 275 miles north of San Francisco and 100 miles south of the Oregon border, Humboldt State University (HSU) is the most isolated CSU campus (Figure 1A). The surrounding area is rural and the population is predominately non-Hispanic White (>75%), contrasting with much more diverse state-wide demographic figures (2012 Census Data). HSU’s incoming student classes more closely resemble the state-wide profile than local demographics (Figure 1B). Since 2009, enrollment of underrepresented minority (URM) students in STEM has increased by over 80% (Figure 1C). A large majority of low income and first generation students are also URMs (Figure 1D). While HSU has embraced this diversity, it is a less disheartening academic outcomes. The six year graduation rate for HSU URM students in STEM is 22 percentage points lower than non-URM students (Figure 1E). The six year graduation rate for HSU URM students in STEM is 22 percentage points lower than non-URM students. Students who qualify for Pell grants have a 28% 6-year graduation rate in STEM Introductory gateway courses.

Methods

The HSU STEM Collaboratives program was designed to test the hypothesis that building learning communities will address three key problems on our campus that national evidence suggests are important causes of low STEM student performance in STEM: (1) the status quo efforts on campus to address student success are not integrated and do not reach all STEM students; (2) too few HSU students develop the self-efficacy, study habits, and sense of academic belonging necessary for success; and (3) Gateway courses have low success rates, especially for underrepresented students.

The first learning community, The Klamath Connection, will weave topics into a summer immersion, freshman year experience (FYE), introductory gateway courses, and both introductory gateway courses and general education requirements. Goals to improve these issues have been identified. Assessment measures including student surveys and focus groups will be used to evaluate the effectiveness of our program (available upon request).

The Project

Figure 1: Issues in HSU Student Success in STEM. A. HSU is the most geographically isolated CSU campus located just south of the Klamath River. B. HSU’s student population is more reflective of the state demographics than that of the county. C. HSU’s URM first time freshman STEM Majors has increased over 80% in 4 years. D. HSU first generation and low income students are predominantly URM. E. Six year graduation rates in STEM by demographic. F. URM students demonstrate a higher nonsuccess rate in STEM introductory gateway courses.

Table 1: Three Key Problems on the HSU campus hypothesized to contribute to reduced success in STEM and Identified Goals to address them. Assessment measures including student surveys and focus groups will be used to evaluate the effectiveness of our program.

Problem 1: The status quo efforts on campus to address student success are not integrated and do not reach all STEM students.

Goal 1a: To provide an integrated support system for STEM students with a focus on student success

Goal 1b: To broaden support efforts for STEM students with a focus on student success.

Problem 2: Too few students develop the self-efficacy, effective study habits and sense of academic belonging.

Goal 2: To develop the self-efficacy, study habits, and sense of academic belonging necessary for student success in STEM.

Problem 3: Gateway courses have low success rates, especially for underrepresented students.

Goal 3: To increase success rates for STEM gateway courses, especially for underrepresented students, through transformed block-scheduled course offerings.

Figure 2: An illustration of how a single topic within a place-based theme, in this case blue-green algae in the Klamath River, can be woven across the freshman year curriculum. A. Blue Green Algae in the Klamath River (photo from Karuk Tribe).

Figure 3: Addressing Problems in STEM Success through Place Based Learning Communities. A. Hypothesized cause-effect chain resulting from a place-based learning community, leading to the ultimate goal of improved retention and graduation rates. B. The Klamath Connection Learning Community will weave issues of the Klamath Basin into the summer immersion, freshman year experience and Fall year coursework.

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